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Safety Culture Behaviour in Electronics Manufacturing Sector (EMS) in Malaysia: The Case of Flextronics

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Abstract

The prevention of work-related injury and illness is of crucial importance to employees, industry and society as a whole. Corporate safety culture is now generally accepted as having a strong influence over workplace accidents and injuries. After implementation of Occupational Safety and Health (OSH) in the organization, there have been an improvement in term of safety in the workplace. However, there are still some cases of accident being reported even after the organizations' management provided training, introducing stricter rules and regulation regarding safety, and provides proper equipment to employee. Hence, the study is carried out in order to examine the effect of employees' attitude and subjective norm toward safety culture behaviour in organization. The study was conducted in manufacturing service industry in Malaysia, and data collection was done at Flextronics Penang Sdn Bhd, a company in the northern part of Malaysia. Data were collected through 196 survey questionnaires distributed to operators (90 respondents), technician (52 respondents) and engineer (27 respondents) in Flextronics Penang Sdn Bhd. The results showed that safety culture behaviour is significantly influenced by employee's attitude and subjective norm. Based on the findings, several recommendations are being put forward in order to improve the safety culture behaviour among employees in the organization. For future research in the same area, it is being recommended to include management commitment, leadership, safety education, and training under scrutiny in order to understand its relationship with safety culture behaviour among employees.

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1. Introduction

The evolution of the global market leads to economic growth via industrialization and significantly impacts the profitability of companies and workers' quality of life, but also resulted in increasing number of accidents at the workplace (Soehod and Laxman, 2007). According to the statistics collected by International Labor Organization (ILO) in Soehod and Laxman (2007), it was estimated about 2 million employees are killed due to work-related accidents and diseases, 270 million occupational accidents and 160 million work-related diseases occur every year. Providing a safe place to work is necessary to every employer in order to provide a comfortable, safe and meet or exceed health and safety requirements in the country. It will leads to the increased productivity of the company itself (Tammy, Gina, Judene, Jack & Carol, 2000). In Malaysia, manufacturing industries have high accident rate among other industry sectors which may be due to lack of safety culture among middle to lower group employees (DOSH annual report, 2013). The existence of the problems shows that employees' behaviour and compliance to OSHA 1994 will lead to positive safety culture and reduction of accidents rate in the manufacturing industries in Malaysia. Apart from OSHA, the term safety culture is also an important aspect in reducing risks and accidents at workplace (Ostrom, Wilhemsen & Kaplan, 1993). Noor, Wan Mohd and Aziz Wan (2013) state that the term *safety culture* was introduced by the International Atomic Energy Agency (IAEA) after nuclear accident at Chernobyl, Ukraine in 1986. A study by Abdul (2006) reported that organizations which emphasize on OSH will create a safer work environment which is critical to the success of any organization because it could sustain employees' commitment and maximize productivity.

2. Literature Review

2.0 *Electric Manufacturing Sector (EMS)*

The electronics manufacturing sector is defined as businesses that manufacture electronic components and sub-assemblies such as printed circuit boards, manufacture, assemble service or repair products that primarily produce an output dependent upon an electronic signal rather than a physical effect. Businesses may make products of their own design and innovation but can also include those who undertake contract manufacturing to meet the demands of others utilizing the extensive skills and capabilities they possess (Earl, Jim, Shijie & Doug, 2000).

2.1 Occupational Safety and Health Act (OSHA)

In 2013, the statistic of occupational accident in Malaysia indicates that the highest non-permanent, permanent disabilities and fatal accidents which involved manufacturing industry recorded 58 death cases, 1469 non-permanent disability cases and 128 permanent disability cases (DOSH annual report, 2013). The statistic shows that agriculture, forestry, fishing and logging sectors are the second highest contributor to the cases recorded: 33 deaths cases, 488 non-permanent disabilities cases and 14 permanent disabilities cases. This is followed by accidents in the construction sector which recorded 69 death cases, 83 non-permanent disability cases and 12 permanent disability cases. Thus, accidents and their consequences continue to be a major public health concern (DOSH annual report, 2013). Occupational Safety and Health Act (OSHA) 1994 stated that the self-regulation concept was promulgated based on the primary responsibility of ensuring safety, health and welfare of all persons at all places of work. Therefore, an introduction of safety culture can be seen as a systematic solution towards the establishment of zero accidents in the workplace. Based on this scenario, this study is carried out to measure the safety culture in manufacturing industry in Malaysia. Choudhry, Fang and Mohamed (2007) suggested that the dimension of safety

culture can be assessed independently or in combination of qualitative and quantitative methods. This study aims to focus on such as safety management systems and procedures (situational), management commitment (behavioural), employee involvement (behavioural), safety attitudes (psychological), workmate influence (psychological), safety knowledge (psychological) and safety behaviour (psychological) (Everon, 2010).

2.2 Safety Culture Behaviour

The historical of concept of safety-culture was determined from the analysis of the Chernobyl 1986 nuclear power plant accident in Ukraine. This accident caused severe political and social shock to Europe that it was imperative that the causes of this event were fully investigated (John, 2010). Since then, the management started to realize the importance of safety culture which has positive significance in the United States and the international community. The result of the assessments of these events revealed that the weaknesses of safety culture were the root cause or it increases the severity of problems (Safety Culture Policy Statement).

Safety culture is generally defined as the parts of an organization's culture that relate to safety (Cooper, 2000). The degree to which an organization's safety culture is the same as its organizational culture is likely to depend on the types and magnitudes of risks that are involved in its work activities where industries are high-risk, in terms of either process or personal safety, there is an expectation that the organization's culture and safety culture would be one and the same, as safety should be a key driver in all organizational decisions and practices (Cooper, 2000). Safety culture, which is influenced by organizational culture, is also affected by external business and societal influences; such as market conditions and changes in societal values (Cooper, 2000; Cox & Flin 1998). According to Guldenmnund (2000), safety culture is also defined as the organizational culture aspect that impacts on attitudes and behaviour related to increasing or decreasing risk at workplace.

Jeffrey, Linda, Sandra, Bob, and Gene (2007) suggested that the following key concepts of safety culture:

- Culture and safety have a clear connection.
- Safety culture is best defined and indexed by an organization's norms, attitudes, values, and beliefs regarding safety.
- Effective top to bottom safety communication and interactions enhance safety culture.
- Policies, procedures, employee safety responsibilities and safety messages must be clear and simple.
- Hiring practices, safety training and education, company orientation and safety management are all key components of a safety culture.
- Measuring drivers of safety performance and the organization as a whole are key components of a safety culture.

Pidgeon and O'Leary (2000) reported that a good safety culture may reflect and be promoted by four factors 1) senior management commitment to safety, 2) realistic and flexible customs and practices for handling both well-defined and ill-defined hazards, 3) continuous organizational learning through practices such as feedback systems, monitoring and analysis, 4) a care and concern for hazards that is shared across the workforce.

2.3 Relationship between Attitude and Safety Culture Behaviour

Psychologists define attitudes as a learned tendency to evaluate things in a certain way. This can include evaluations of people, issues, objects or events. Such evaluations are often positive or negative, but they can also be uncertain at times (Kendra Cherry, 2014). At the beginning of the study, social psychologists agreed that people's attitudes are predictable to their behaviour. Then, a collective study by Wicker (1972) conclude that people's

attitudes hardly predict their varying behaviours and he also believes that attitude and action (behaviour) feed each other. This was supported by Connor and Armitage (1998) who found that two possible explanations on how attitudes shape the behaviour. The first relates to the individual attitude that has a positive attitude will reflect on the behaviour and additional factor influence such as subjective norms will form an intention about how people behave. Ajzen and Fishbein (2005) believed the attitude behaviour relation works the other way around, with people's behaviour as the horse and people's attitudes as the cart. Ajzen and Fishbein (1980) claimed that attitude is a function of beliefs form with various characteristics, qualities and attributes.

Attitude toward the behaviour is a person's overall evaluation of the behaviour. It is assumed to have two components which work together; beliefs about consequences of the behaviour and the corresponding positive or negative judgments about each of these features of the behaviour (Beduz, 2012). Kendra Cherry (2014) states that people tend to assume behaviour in accordance with their attitudes. However, social psychologists have found that attitudes and actual behaviour are not always perfectly aligned. Kendra Cherry (2014) also found that, in some cases, people may actually alter their attitudes in order to better align them with their behaviour. Connor and Armitage (1998) provide possible explanations on how attitudes shape behaviour, and it relates to attitudes. Individuals who have a positive attitude toward performing work will reflect on the behaviour and in conjunction with other influences such as subjective norms will form an intention about how to behave. Dean, Philip and Zane (1995) mentioned clearly that there is a link between attitudes and behaviour. In tests of the attitude-behaviour relationship a link stronger than chance was found. Terry, Hogg and McKimmie, (2000) found that attitude and subjective norm predicted behaviour better and Titah and Barki (2009) found that mortgage customers' switching behaviour was influenced by attitude and subjective norm. Thus, both have been found to be both positive and significant.

2.4 Subjective Norm and the Relationship between Subjective Norms towards Behaviour

Subjective norms are a person's own estimate of the social pressure to perform or not perform the target behaviour. Subjective norms are assumed to have interaction; beliefs about how other people, who may be in some way important to the person, would like them to behave Ajzen and Fishbein (2005) defined subjective norms as a function of beliefs, though beliefs of a different kind. These are the person's beliefs that specific individuals or a group think he should or should not perform the behaviour. These beliefs, underlying a person's subjective norm, are termed normative beliefs. The specific individuals or group are called referents. Knowing a person's beliefs about the relevant referents is, however, not sufficient to predict or understand her/his subjective norm. In order to do this, it is also necessary to assess her/his motivation to comply with each of the referents. Motivation to comply refers to a person's willingness to behave according to his perception of how referents think he should behave (Avraham, 2000).

Beduz (2012) states that subjective norm refers to the individual's perceptions of social pressure to perform or not a behaviour; that is, if an individual believes that significant others approve (or disapprove) of the behaviour, he/she is more (or less) likely to perform the behaviour. Subjective norm was not predictive of intention, consistent with Armitage and Conner (2001), who, in their meta-analysis of 144 studies, found that the subjective norm-behaviour relationship have significantly weaker than the attitude-behaviour relationship. Subjective norm may exert pressure to perform or not perform a given behaviour, independent of the person's own attitude toward the behaviour in question. In other words, subjective norm is the perceived social pressure to engage or not to engage in a behaviour Ajzen & Fishbein (2005). Another study by Alexis (2003) to determine why horticulture industry professionals participate in extension programs and what would possibly motivate those who do not attend to become more active in this program found that, social pressure and perceived control are important to horticulture professionals, to support the attitude for predicting attendance.

2.5 Theory of Reasoned Action (TRA)

Theory of Reasoned Action was developed to examine the relationship between attitudes and behaviour (Ajzen 1988; Fishbein & Ajzen 1975; Werner 2004). TRA has two basic concepts which include principles of compatibility and concept of behavioural intention (Ajzen 1988; Fishbein & Ajzen 1975). Compatibility specifies principle useful to examine the behaviour directed to attitudes that correspond to the specific target, time and context assessed (Ajzen 1988; Fishbein & Ajzen 1975) while the concept of behaviour intention is useful to predict the individual's motivation to engage or not in behaviour to determine the attitudes (Fishbein & Ajzen 1975). The behaviour intention shows how much effort an individual would like to commit to perform such behaviour. Higher commitment is more likely to mean that behaviour would be performed. Behaviour intention is determined by attitudes and subjective norms (Ajzen 1988; Fishbein & Ajzen 1975). An attitude refers to an individual's perception either favorable or unfavorable toward specific behaviour (Werner 2004). Another factor is subjective norm which refers to the individual's subjective judgment that gives support for behaviour (Werner, 2004). In 1975, Ajzen and Fishbein developed Theory of Reasoned Action (TRA). In the later part, this theory was modified in 1980. Theory of Reasoned Action can be applied to study human behaviour and build up suitable interference. Attitude and subjective norms are two key constructs of the theories of TRA (Ajzen & Fishbein 1980). Both Ajzen and Fishbein (1980) believe that attitudes could explain human actions. They explained that people could consider the implications of actions before people make the decision either to engage or not in a given behaviour. Thus, TRA provides the best framework to examine the relationship of attitudes and subjective norm toward behaviours (Ajzen & Fishbein 1980).

3. Research Methodology

The samples of the study are workers in Flextronics Penang Sdn Bhd. The company is located in the northern part of Malaysia, in the state of Penang. The study purposely choose this organization because there were cases of workplace accidents being reported from January until December 2013. Accident analysis showed that most accidents affect human hand (16 cases), lower limb (10 cases), head (8 cases) and followed by upper limb and misc. respectively. (Flextronics's Environmental, Health and Safety report, 2013). This company has 300 workers, and according to Cavana, Delaya and Sekaran (2011), the sample size for 300 populations is 169 respondents. The breakdown of the population and sampling is presented in Table 1.1

Measurement variables can be divided into two major types: nominal variables and qualitative variables. A nominal variable is used to name or identify a particular characteristic such as gender, age, position, education level, department and years of service. Nominal variables are used in behavioural research to indicate the condition that a person has been assigned to in an experimental research design (Ana, 2013). In contrast to a nominal variable, a qualitative variable uses numbers to indicate the extent to which a person possesses a characteristic of interest (Ana, 2013). There are 21 independent questions and 7 dependent questions listed in the survey form. The sources of instruments are from Beduz (2012), Huang, Fu, Boben (1999), Kathryn, Jerold & Donald, (1997) and Beduz (2012).

The variables attitudes, subjective norm and behavioural in TRA are measured on Likert Scale using phrases such as agree-disagree. A positive product indicates behavioural intent (Ajzen & Fishbein, 1980). The questionnaires in this dissertation were constructed based on a research by William and Richard (1945). The questions were modified to suit this study. In this study, the two independent variables are employees' attitudes and subjective norm while the dependent variable is safety culture behaviour.

4.0 Result and Findings

To seek the reliability of the questionnaires and the variables analyzed, reliability test was conducted before the distribution of the questionnaires. Table below shows the reliability of the questionnaires.

Table 1.1: Reliability Analysis

No	Variable	Reliability (Cronbach's Alpha)
1	Attitude	0.776
2	Subjective Norm	0.713
3	Safety Culture Behaviour	0.742

This study also examine the relationship between employees' attitude and subjective norm towards employees' safety culture behaviour. Table 1.2 shows the summary of data analysis of the relationship among the variables.

Table 1.2: Summary of Data Analysis

	Attitude	Subjective Norm	Behaviour
Mean	4.218	3.234	3.186
Correlation analysis			
Pearson's Correlations	0.512	0.337	1
Sig (Correlation)	0.000	0.000	
Regression analysis			
Beta	0.392	0.136	
Sig (Regression)	0.000	0.049	
R Square		0.227	

Based on Table 1.2, the mean score of attitude is 4.218, subjective norm is 3.234 and behaviour is 3.186. Correlation analysis found that attitude, subjective norm and behaviour are significantly and positively related ($p < 0.005$). Based on the regression analysis, both attitude and subjective norm have positive significant influence toward safety behaviour where p-value is 0.000 and 0.049 respectively. The R-square of the proposed framework of the study is 0.227. It means that the proposed framework manage to explain 22.7% variation in the dependent variable.

5. Discussion and Conclusion

In conclusion, this research is aimed to find out factors that influence the safety culture behaviour among workers in electronic manufacturing sector in Malaysia. The findings of the study shows that both workers' attitude and subjective norms have positive influence on safety culture behaviour. This study supports the body of knowledge in Theory of Reasoned Action by Ajzen (1991). Future study may focus on the management commitment and leadership of the top level manager in developing positive safety behavioural aspects amongst employees. Employees will be less safety conscious and willing to take more risks to get the work completed if the management does not support the safety process. Another behavioural aspect that should not be neglected is educational and training programs. The organizations must provide training programs continuously not only at the initial stage of employment in order to increase awareness and provide safe working environment. The extent of employee safety and health training is dependent upon employee's occupational factors, company resources available to finance training, importance placed on safety and other organizational factors. In the enforcement level, EHS and quality department should pay more attention in terms of audit activities to make employees more concerned and stay focused at the workplace. Moreover, suggested to use Theory of Planned Behaviour for next research which allows for perceived control to affect behaviour directly, regardless of the behavioural intention that

is formed. Other than that, the sample size should be increased in securing the reliability, validity and significance of the research. The limitation in this study is influenced by reliability, correlation and regression result. If the population can be increased, it will lead to better result especially R square value and reliability of analysis.

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